

APPENDIX E

WORKSHEETS FOR OFFSITE CONSEQUENCE ANALYSIS

Using the Methods in this Guidance

April 15, 1999

WORKSHEET 1
WORST-CASE ANALYSIS FOR TOXIC GAS

1. Select Scenario (<i>defined by rule for worst case as release of largest quantity over 10 minutes</i>)		Guidance Reference
• Identify toxic gas	<i>Name:</i> _____ <i>CAS number:</i> _____ - ____ - ____	Chapter 2 Section 3.1
• Identify largest quantity in largest vessel or pipeline	<i>Quantity (pounds):</i> _____	
• Identify worst-case meteorological conditions	<i>Atmospheric stability class:</i> F <i>Wind speed:</i> 1.5 m/s <i>Ambient temperature:</i> 25 °C <i>Relative humidity:</i> 50%	
2. Determine Release Rate		
• Estimate release rate <i>Quantity/10 min, except gases liquefied by refrigeration in some cases</i>	<i>Release rate (lbs/min):</i> _____ <i>Will release always take place in enclosure?</i> _____ (If yes, go to next step)	Section 3.1.1
• Revise release rate to account for passive mitigation (enclosure)	<i>Can release cause failure of enclosure?</i> _____ (If yes, use unmitigated release rate) <i>Factor to account for enclosure:</i> 0.55 <i>Mitigated release rate (lbs/min):</i> _____	Section 3.1.2
3. Determine Distance to the Endpoint Specified by Rule		
• Identify endpoint	<i>Endpoint (mg/L):</i> _____	Exhibit B-1
• Determine gas density <i>Consider conditions (e.g., liquefied under pressure)</i>	<i>Dense:</i> _____ <i>Neutrally buoyant:</i> _____	Exhibit B-1
• Determine site topography <i>Rural and urban defined by rule</i>	<i>Rural:</i> _____ <i>Urban:</i> _____	Section 2.1
• Determine appropriate reference table of distances <i>Use 10-minute tables</i>	<i>Reference table used (number):</i> _____	Chapter 4 Reference Tables 1-12
• Find distance on reference table	<i>Release rate/endpoint (neutrally buoyant):</i> _____ <i>Distance to endpoint (mi):</i> _____	Chapter 4 Reference Tables 1-12

WORKSHEET 2
WORST-CASE ANALYSIS FOR TOXIC LIQUID

1. Select Scenario (<i>defined by rule for worst case as release of largest quantity to form an evaporating pool</i>)		Guidance Reference
<ul style="list-style-type: none"> • Identify toxic liquid • Identify concentration for solutions or mixtures 	<i>Name:</i> _____ <i>CAS number:</i> _____-____-____ <i>Concentration in solution or mixture (wt %):</i> ____	Chapter 2 Section 3.2 Section 3.2.4 for mixtures
<ul style="list-style-type: none"> • Identify largest quantity in largest vessel or pipeline 	<i>Quantity (pounds):</i> _____ <i>Quantity of regulated substance in mixture:</i> ____	
<ul style="list-style-type: none"> • Identify worst-case meteorological conditions 	<i>Atmospheric stability class:</i> F <i>Wind speed:</i> 1.5 m/s <i>Ambient temperature:</i> 25 °C <i>Relative humidity:</i> 50%	
2. Determine Release Rate		
<ul style="list-style-type: none"> • Determine temperature of spilled liquid <i>Must be highest maximum daily temperature or process temperature, or boiling point for gases liquefied by refrigeration</i> 	<i>Temperature of liquid (°C):</i> _____	Section 3.2 Section 3.1.3
<ul style="list-style-type: none"> • Determine appropriate liquid factors for release rate estimation 	<i>LFA:</i> _____ <i>LFB:</i> _____ <i>DF:</i> _____ <i>TCF:</i> _____	Section 3.2, Exhibits B-2, B-4 Section 3.3, Exhibit B-3 for water solutions
<i>Estimate Maximum Pool Area</i>		
<ul style="list-style-type: none"> • Estimate maximum pool area <i>Spilled liquid forms pool 1 cm deep</i> 	<i>Maximum pool area (ft²):</i> _____	Section 3.2.3 Equation 3-6

WORKSHEET 2 (continued)

<i>Estimate Pool Area for Spill into Diked Area</i>		
<ul style="list-style-type: none"> • Estimate diked area <i>Consider failure of dikes or overflow of diked area</i> 	<p><i>Diked area (ft²):</i> _____</p> <p><i>Is diked area smaller than maximum area?</i> _____ (If no, use maximum area to estimate release rate)</p> <p><i>Diked volume (ft³):</i> _____</p> <p><i>Spilled volume (ft³):</i> _____</p> <p><i>Is spilled volume smaller than diked volume?</i> _____ (If no, estimate overflow)</p> <p><i>Overflow volume (ft³):</i> _____</p> <p><i>Overflow area (ft²):</i> _____</p>	Section 3.2.3
<ul style="list-style-type: none"> • Choose pool area for release rate estimation <i>Maximum area, diked area, or sum of diked area and overflow area</i> 	<p><i>Pool area (ft²):</i> _____</p>	Section 3.2.3
<i>Estimate Release Rate from Pool</i>		
<ul style="list-style-type: none"> • Estimate release rate for undiked pool (maximum pool area) <i>Based on quantity spilled, LFA or LFB, and DF</i> 	<p><i>Release rate (lbs/min):</i> _____</p>	Section 3.2.2 Section 3.2.4 (mixtures) Equation 3-3 or 3-4
<ul style="list-style-type: none"> • Estimate release rate for diked pool (use pool area from previous section) <i>Based on pool area and LFA or LFB</i> 	<p><i>Release rate (lbs/min):</i> _____</p>	Section 3.2.2 Section 3.2.4 (mixtures) Equation 3-7 or 3-8
<ul style="list-style-type: none"> • Revise release rate for release in building <i>Apply factor to release rate</i> 	<p><i>Release rate if outside (lbs/min)</i> _____ (Use release rate for undiked or diked pool)</p> <p><i>Factor to account for enclosure:</i> 0.1</p> <p><i>Revised release rate (lbs/min):</i> _____</p>	Section 3.2.3 Equations 3-9, 3-10
<ul style="list-style-type: none"> • Revise release rate for temperature <i>Apply appropriate TCF to release rate</i> 	<p><i>Revised release rate (lbs/min):</i> _____</p>	Section 3.2.5 Equation 3-11
<ul style="list-style-type: none"> • Estimate duration of release 	<p><i>Release duration (min):</i> _____</p>	Section 3.2.2 Equation 3-5

WORKSHEET 2 (continued)

3. Determine Distance to the Endpoint		
<ul style="list-style-type: none"> • Identify endpoint <i>Specified by rule</i> 	<p><i>Endpoint (mg/L):</i> _____</p>	Exhibit B-2
<ul style="list-style-type: none"> • Determine vapor density 	<p><i>Dense:</i> ____</p> <p><i>Neutrally buoyant:</i> ____</p>	Exhibit B-2
<ul style="list-style-type: none"> • Determine site topography <i>Rural and urban defined by rule</i> 	<p><i>Rural:</i> ____</p> <p><i>Urban:</i> ____</p>	Section 2.1
<ul style="list-style-type: none"> • Determine appropriate reference table of distances <i>Based on release duration, vapor density, topography</i> 	<p><i>Reference table used (number):</i> _____</p>	Chapter 4 Reference Tables 1-12
<ul style="list-style-type: none"> • Find distance on reference table 	<p><i>Release rate/endpoint (neutrally buoyant):</i> _____</p> <p><i>Distance to endpoint (mi):</i> _____</p>	Chapter 4 Reference Tables 1-12

WORKSHEET 3
WORST-CASE ANALYSIS FOR FLAMMABLE SUBSTANCE

1. Select Scenario (<i>defined by rule for worst case as vapor cloud explosion of largest quantity</i>)		Guidance Reference
<ul style="list-style-type: none"> • Identify flammable substance 	Name: _____ CAS number: _____-_____-____	Chapter 2 Section 3.1
<ul style="list-style-type: none"> • Identify largest quantity in largest vessel or pipeline <i>Consider total quantity of flammable substance, including non-regulated substances in flammable mixtures</i> 	Quantity (pounds): _____	
2. Determine Distance to the Endpoint (<i>endpoint specified by the rule as 1 psi overpressure; yield factor assumed to be 10% for TNT-equivalent model</i>)		
<ul style="list-style-type: none"> • Estimate distance to 1 psi using Reference Table <i>Find quantity, read distance from table</i> 	Distance to 1 psi (mi): _____	Chapter 5 Reference Table 13
<ul style="list-style-type: none"> • Alternatively, estimate distance to 1 psi using equation 	For pure substance: Heat of combustion (kJ/kg): _____ For mixture: Heat of combustion of major component (kJ/kg): _____ Heats of combustion of other components (kJ/kg): _____, _____, _____ Distance to 1 psi (mi). _____	Chapter 5 Appendix C.1 Appendix C.2 Exhibit C-1

WORKSHEET 4
ALTERNATIVE SCENARIO ANALYSIS FOR TOXIC GAS

1. Select Scenario		Guidance Reference
<ul style="list-style-type: none"> • Identify toxic gas 	<i>Name:</i> _____ <i>CAS number:</i> _____-_____-____	Chapter 6 Chapter 7 Section 7.1
<ul style="list-style-type: none"> • Identify conditions of storage or processing of toxic gas <i>Treat gases liquefied by refrigeration as liquids</i> 	<i>Non-liquefied pressurized gas:</i> _____ <i>Gas liquefied under pressure:</i> _____ <i>In tank:</i> _____ <i>In pipeline:</i> _____ <i>Other (describe):</i> _____ _____	
<ul style="list-style-type: none"> • Develop alternative scenario <ul style="list-style-type: none"> ▸ More likely than worst case ▸ Should reach endpoint off site 	<i>Describe scenario:</i> _____ _____ _____	
<ul style="list-style-type: none"> • Identify average meteorological conditions 	<i>Atmospheric stability class:</i> D <i>Wind speed:</i> 3.0 m/s <i>Ambient temperature:</i> 25 °C <i>Relative humidity:</i> 50%	
2. Determine Release Rate		
<ul style="list-style-type: none"> • Estimate gas release rate from hole in tank (choked/ maximum flow) for <ul style="list-style-type: none"> ▸ Pressurized gas ▸ Gas liquefied under pressure released from vapor space 	<i>Hole area (in²):</i> _____ <i>Tank pressure (psia):</i> _____ <i>Tank temperature (K):</i> _____ <i>GF:</i> _____ <i>Release rate (lbs/min):</i> _____	Section 7.1.1 Equation 7-1 Exhibit B-1
<ul style="list-style-type: none"> • Estimate flashing liquid release rate from hole in tank <ul style="list-style-type: none"> ▸ Gas liquefied under pressure released from liquid space 	<i>Hole area (in²):</i> _____ <i>Tank pressure (psig):</i> _____ <i>DF:</i> _____ <i>Liquid height above hole (in):</i> _____ <i>Release rate (lbs/min):</i> _____	Section 7.1.2 Equation 7-2 Exhibit B-1

WORKSHEET 4 (continued)

<ul style="list-style-type: none"> Estimate flashing liquid release rate from break in long pipeline <ul style="list-style-type: none"> Gas liquefied under pressure completely filling pipeline 	<p>Initial flow rate (lbs/min): _____</p> <p>DF: _____</p> <p>Initial flow velocity (ft/min): _____</p> <p>Pipe pressure (psi): _____</p> <p>Change in pipe elevation (ft): _____</p> <p>Cross-sectional pipe area (ft²): _____</p> <p>Release rate (lbs/min): _____</p>	Sections 7.1.1 and 7.2.1 Exhibit B-1
<ul style="list-style-type: none"> Estimate release duration 	<p>Time to stop release (min): _____</p> <p>Time to empty tank or pipe (min): _____</p> <p>Default release duration: 60 min</p>	Section 7.1.1
<ul style="list-style-type: none"> Revise release rate for passive mitigation (enclosure) 	<p>Release rate if outside (lbs/min): _____</p> <p>Factor to account for enclosure: 0.55</p> <p>Revised release rate (lbs/min): _____</p>	Section 7.1.2 Section 3.1.2
<ul style="list-style-type: none"> Revise release rate for active mitigation 	<p>Active mitigation technique used: _____</p> <p>_____</p> <p>Time to stop release using active technique (min): _____</p> <p>Fractional release rate reduction by active technique: _____</p> <p>Revised release rate (lb/min): _____</p>	
<ul style="list-style-type: none"> Estimate release duration (mitigated release) 	<p>Release duration (min): _____</p>	Section 7.1.2
<ul style="list-style-type: none"> Other release rate estimation 	<p>Release rate (lb/min): _____</p> <p>Method of release rate estimation (describe): _____</p> <p>_____</p> <p>Release duration (min): _____</p>	
3. Determine Distance to the Endpoint		
<ul style="list-style-type: none"> Identify endpoint <i>Specified by rule</i> 	<p>Endpoint (mg/L): _____</p>	Exhibit B-1
<ul style="list-style-type: none"> Determine gas density <i>Consider conditions (e.g., liquefied under pressure, refrigeration)</i> 	<p>Dense: _____</p> <p>Neutrally buoyant: _____</p>	Exhibit B-1
<ul style="list-style-type: none"> Determine site topography <i>Rural and urban defined by rule</i> 	<p>Rural: _____</p> <p>Urban: _____</p>	Section 2.1

WORKSHEET 4 (continued)

<ul style="list-style-type: none">• Determine appropriate reference table of distances <i>Based on release duration, vapor density, and topography</i>	Reference table used (number): _____	Chapter 8 Reference Tables 14-25
<ul style="list-style-type: none">• Find distance on reference table	Release rate/endpoint (neutrally buoyant): _____ Distance to endpoint (mi): _____	Chapter 8 Reference Tables 14-25

WORKSHEET 5
ALTERNATIVE SCENARIO ANALYSIS FOR TOXIC LIQUID

1. Select Scenario		Guidance Reference
<ul style="list-style-type: none"> • Identify toxic liquid <i>Include gases liquefied by refrigeration</i> • Identify concentration for solutions or mixtures 	<i>Name:</i> _____ <i>CAS number:</i> _____-_____-_____ <i>Concentration in solution or mixture (wt %):</i> ____	Chapter 6 Chapter 7 Section 7.2
<ul style="list-style-type: none"> • Identify conditions of storage or processing of toxic liquid 	<i>Atmospheric tank:</i> _____ <i>Pressurized tank:</i> _____ <i>Pipeline:</i> _____ <i>Other (describe):</i> _____ _____	
<ul style="list-style-type: none"> • Develop alternative scenario <ul style="list-style-type: none"> ▸ More likely than worst case ▸ Should reach endpoint off site 	<i>Describe scenario:</i> _____ _____ _____	
<ul style="list-style-type: none"> • Identify meteorological conditions 	<i>Atmospheric stability class:</i> F <i>Wind speed:</i> 3.0 m/s <i>Ambient temperature:</i> 25 °C <i>Relative humidity:</i> 50%	
2. Determine Release Rate		
<i>Determine Liquid Release Rate and Quantity Released into Pool</i>		
<ul style="list-style-type: none"> • Estimate liquid release rate from hole in atmospheric tank 	<i>Hole area (in²):</i> _____ <i>LLF:</i> _____ <i>Liquid height above hole (in):</i> _____ <i>Liquid release rate (lbs/min):</i> _____	Section 7.2.1 Equation 7-4 Exhibit B-2
<ul style="list-style-type: none"> • Estimate liquid release rate from break in long pipeline 	<i>Initial flow rate (lbs/min):</i> _____ <i>DF:</i> _____ <i>Initial flow velocity (ft/min):</i> _____ <i>Pipe pressure (psi):</i> _____ <i>Change in pipe elevation (ft):</i> _____ <i>Cross-sectional pipe area (ft²):</i> _____ <i>Liquid release rate (lbs/min):</i> _____	Section 7.2.1 Equations 7-5 - 7-7 Exhibit B-2
<ul style="list-style-type: none"> • Estimate liquid release duration 	<i>Time to stop release (min):</i> _____ <i>Time to empty tank to level of hole (min):</i> _____	Section 7.2.1

WORKSHEET 5 (continued)

<ul style="list-style-type: none"> Revise liquid release duration for active mitigation 	<p>Active mitigation technique (describe): _____</p> <p>Time to stop release (min): _____</p>	Section 7.2.2
<ul style="list-style-type: none"> Estimate quantity of liquid released into pool <p><i>Liquid release rate times duration</i></p>	<p>Quantity of liquid released (lbs): _____</p>	Sections 7.2.1, 7.2.2, 7.2.3
Determine Pool Area and Evaporation Rate from Pool		
<ul style="list-style-type: none"> Determine temperature of spilled liquid 	<p>Temperature of liquid (°C): _____</p>	Section 7.2.3
<ul style="list-style-type: none"> Determine appropriate liquid factors for release rate estimation 	<p>LFA: _____</p> <p>LFB: _____</p> <p>DF: _____</p> <p>TCF: _____</p>	Sections 7.2.3, 3.2, and Exhibits B-2, B-4 Section 3.3 and Exhibit B-3 for water solutions
Estimate Maximum Pool Area		
<ul style="list-style-type: none"> Estimate maximum pool area <p><i>Spilled liquid forms pool 1 cm deep</i></p>	<p>Maximum pool area (ft²): _____</p>	Section 7.2.3, 3.2.3 Equation 3-6
Estimate Pool Area for Spill into Diked Area		
<ul style="list-style-type: none"> Estimate diked area <p><i>Consider possibility of failure of dikes or overflow of diked area</i></p>	<p>Diked area (ft²): _____</p> <p>Is diked area smaller than maximum area? ____ (If no, use maximum area to estimate release rate)</p> <p>Diked volume (ft³): _____</p> <p>Spilled volume (ft³): _____</p> <p>Is spilled volume smaller than diked volume? ____ (If no, estimate overflow)</p> <p>Overflow volume (ft³): _____</p> <p>Overflow area (ft²): _____</p>	Section 7.2.3, 3.2.3
<ul style="list-style-type: none"> Choose pool area for evaporation rate estimation <p><i>Maximum area, diked area, or sum of diked area and overflow area</i></p>	<p>Pool area (ft²): _____</p>	Section 7.2.3, 3.2.3

WORKSHEET 5 (continued)

Estimate Release Rate from Pool		
<ul style="list-style-type: none"> Estimate release rate for undiked pool <i>Based on quantity spilled, LFA or LFB, and DF</i> 	Release rate (lbs/min): _____	Section 7.2.3 Section 3.2.4 (mixtures) Equation 7-8 or 7-9
<ul style="list-style-type: none"> Estimate release rate for diked pool (use pool area from previous section) <i>Based on pool area and LFA or LFB</i> 	Release rate (lbs/min): _____	Sections 7.2.3, 3.2.2 Section 3.2.4 (mixtures) Equation 7-10 or 7-11
<ul style="list-style-type: none"> Revise release rate for temperature <i>Apply appropriate TCF to release rate</i> 	Revised release rate (lbs/min): _____	Sections 7.2.3, 3.2.5 Equation 3-11
<ul style="list-style-type: none"> Revise release rate for release in building <i>Apply factor to release rate</i> 	Release rate if outside (lbs/min): _____ Factor to account for enclosure: 0.05 Revised release rate (lbs/min): _____	Sections 7.2.3, 3.2.3
<ul style="list-style-type: none"> Revise release rate for active mitigation technique 	Active mitigation technique used: _____ _____ Fractional release rate reduction by active technique: _____ Revised release rate (lb/min): _____	Section 7.2.3
<ul style="list-style-type: none"> Compare liquid release rate and pool evaporation rate Choose smaller release rate as release rate for analysis 	Release rate (lb/min): _____	Section 7.2.3
3. Determine Distance to the Endpoint		
<ul style="list-style-type: none"> Identify endpoint <i>Specified by rule</i> 	Endpoint (mg/L): _____	Exhibit B-2
<ul style="list-style-type: none"> Determine vapor density 	Dense: _____ Neutrally buoyant: _____	Exhibit B-2
<ul style="list-style-type: none"> Determine site topography <i>Rural and urban defined by rule</i> 	Rural: _____ Urban: _____	Section 2.1

WORKSHEET 5 (continued)

<ul style="list-style-type: none">• Determine appropriate reference table of distances <i>Based on release duration, vapor density, and topography</i>	Reference table used (number): _____	Chapter 8 Reference Tables 14-25
<ul style="list-style-type: none">• Find distance on reference table	Release rate/endpoint (neutrally buoyant): _____ Distance to endpoint (mi): _____	Chapter 8 Reference Tables 14-25

WORKSHEET 6
ALTERNATIVE SCENARIO ANALYSIS FOR FLAMMABLE SUBSTANCE

1. Select Scenario		Guidance Reference
<ul style="list-style-type: none"> • Identify flammable substance 	<i>Name:</i> _____ <i>CAS number:</i> _____-_____-____	Chapter 6
<ul style="list-style-type: none"> • Identify conditions of storage or processing of flammable substance <p><i>Treat gases liquefied by refrigeration as liquids</i></p>	<i>Non-liquefied pressurized gas:</i> _____ <i>Gas liquefied under pressure:</i> _____ <i>Gas liquefied by refrigeration:</i> _____ <i>Liquid under atmospheric pressure:</i> _____ <i>Liquid under pressure greater than atmospheric:</i> _____ <i>Other (describe):</i> _____ _____	
<ul style="list-style-type: none"> • Identify appropriate scenario <ul style="list-style-type: none"> ▸ Vapor cloud fire ▸ Pool fire ▸ BLEVE/fireball ▸ Vapor cloud explosion ▸ Other (not covered by OCA Guidance) 	<i>Alternative scenario/type of fire or explosion (describe):</i> _____ _____ _____	
2. Determine Release Rate		
<i>Determine Release Rate for Vapor Cloud Fire</i>		
<ul style="list-style-type: none"> • For gas releases and flashing liquid releases, <i>see Worksheet 4</i> 	<i>Release rate (lbs/min):</i> _____	Section 9.1 Section 7.1 Equations 7-1, 7-2, 7-3 Exhibit C-2
<ul style="list-style-type: none"> • For liquid releases (non-flashing), <i>see Worksheet 5</i> 	<i>Liquid release rate (lbs/min):</i> _____ <i>Liquid release duration (min):</i> _____ <i>Quantity in pool (lbs):</i> _____ <i>Release rate to air (lbs/min):</i> _____	Section 9.2 Section 7.2 Equations 7-4- 7-12 Exhibit C-3
<i>Determine Pool Area for Pool Fire</i>		
Estimate pool area: <i>See Worksheet 5</i>	<i>Quantity in pool (lbs):</i> _____ <i>Pool area (ft²):</i> _____	Sections 10.2 Section 7.2 Exhibits C-2, C-3

WORKSHEET 6 (continued)

<i>Determine Quantity for BLEVE</i>		
Determine quantity in tank	Quantity (lbs): _____	Section 10.3
<i>Determine Quantity for Vapor Cloud Explosion</i>		
Determine quantity in tank	Quantity (lbs): _____	Section 10.4
3. Determine Distance to the Endpoint		
<ul style="list-style-type: none"> • Identify endpoint suitable for scenario <ul style="list-style-type: none"> ▸ LFL ▸ 5 kW/m² for 40 seconds ▸ 1 psi overpressure 	Endpoint: _____	Chapter 6 Exhibits C-2, C-3
<i>Determine Distance to LFL for Vapor Cloud Fire</i>		
• Determine vapor density	Dense: _____ Neutrally buoyant: _____	Exhibit B-2
• Determine site topography <i>Rural and urban defined by rule</i>	Rural: _____ Urban: _____	Section 2.1
• Determine appropriate reference table of distances <i>Based on vapor density and topography</i>	Reference table used (number): _____	Section 10.1 Reference Tables 26-29
• Find distance on reference table	Release rate/endpoint (neutrally buoyant): _____ Distance to LFL (mi): _____	Section 10.1 Reference Tables 26-29
<i>Determine Distance to Heat Radiation Endpoint for Pool Fire</i>		
• Calculate distance to 5 kW/m ²	PFF: _____ Pool area (ft²): _____ Distance (ft): _____	Section 10.2 Equation 10-1

WORKSHEET 6 (continued)

<i>Determine Distance to Heat Radiation Endpoint for BLEVE</i>		
Determine distance for radiation from fireball equivalent to 5 kW/m ² for 40 seconds	<i>Quantity (lbs):</i> _____ <i>Distance (mi):</i> _____	Section 10.3 Reference Table 30
<i>Determine Distance to Overpressure Endpoint For Vapor Cloud Explosion</i>		
Determine distance to 1 psi <i>Quantity in cloud can be less than total quantity</i> <i>Yield factor can be less than 10%</i>	<i>FFF:</i> _____ <i>Quantity flashed:</i> _____ <i>Yield factor:</i> _____ <i>Distance to 1 psi (mi):</i> _____	Section 10.4 Exhibit C-2 Reference Table 13